Claims

What is claimed is:

1. A method for obtaining and analyzing multi-dimensional in vivo images, comprising:

a) providing computer-executable software operably configured to receive electronic signals via electronic communication means, said software being programmed to translate the electronic signals into electronic data, and to calculate and format the electronic data into visually-perceivable displays, said software being programmed to automatically eliminate baseline data from the electronic data prior to development of such visually-perceivable displays;

b) providing an imaging device for generating the electronic signals representing corresponding image characteristics, said imaging device being operably coupled to said communication means for operably transmitting the electronic image signals therethrough;

c) injecting an echocontrast material into a targeted body region;

d) scanning said body region with said imaging device in one or more predefined time periods; and

e) displaying electronic images of said body region on a viewable screen, said electronic images representing a multi-dimensional view of said body region, with said multi-dimensional view being automatically divided into user-defined segments for detailed analysis thereof.

2. A method as in Claim 1 wherein said software is programmed to calculate individual pixel intensity change over said time periods.

3. A method as in Claim 1 wherein said software is programmed to calculate overall intensity change over said time periods for each respective said segment.

4. A method as in Claim 1 wherein said software is programmed to display a plurality of selected said multi-dimensional views obtained at distinct predetermined time periods.

5. A method as in Claim 4 wherein said software is programmed to calculate and display a relative data set reflecting changes in multi-dimensional view characteristics between said distinct predetermined time periods.

6. A method as in Claim 5 wherein said distinct time periods include before and after medical treatment.

7. A method as in Claim 9 wherein said imaging device measures perfusion through the body region.

8. A method as in Claim 7 wherein said software is programmed to automatically determine size and location of a perfusion defect area, and to automatically compare data from respective corresponding perfusion defect areas.

9. A method as in Claim 1 wherein said automatic segmentation of a myocardial region may be selectively defined with or without subendocardial/subepicardial division.

10. A method as in Claim 1 wherein the electronic data is calculated by a user-defined technique selected

from the group consisting of median electronic signal intensity value, mean electronic signal intensity, and maximum electronic signal value.

11. A method as in Claim 10 wherein said calculated electronic data is obtained throughout respective said predefined time periods, and is displayed as one or more time-intensity curves.

12. A method as in Claim 11 wherein said software is programmed to selectively simultaneously display a plurality of time-intensity curves from one or more user-defined segments imaged in one or more said time periods.

13. A method as in Claim 1 wherein said user-defined segments are color-coded.

14. A method as in Claim 1 wherein said imaging device is an ultrasonic transducer.

15. A method as in Claim 1 wherein said imaging device is coupled to a catheter device.

16. A method as in Claim 15 wherein said imaging device is positioned adjacent said body region within a respective body vasculature.

17. A method as in Claim 1 wherein said body region is at least a portion of the myocardium.

18. A system for imaging and analyzing perfusion in selected body regions, comprising:

a) an ultrasonic intra-vascular imaging device operably coupled to electronic communication means, said intra-vascular imaging device being operably positioned adjacent respective said body region via a catheter means, said imaging device being configured to operably transmit and receive ultrasonic energy, the

received ultrasonic energy being transformed into electronic signals indicative of ultrasonic contrast intensity measured;

b) a computer having computer-executable software stored thereon, said computer being operably coupled to said electronic communication means for receiving electronic signals therefrom, said software being programmed to translate the electrical signals into electronic data, and to transpose and calculate such data into multi-dimensional displays which are visually perceivable on a monitor operably coupled to said computer, such multi-dimensional displays depicting perfusion characteristics of the selected body region, said software automatically eliminates background data from said electronic data prior to calculating time-based ultrasonic echo intensity change.

19. A system as in Claim 18 wherein said imaging device is an ultrasonic transducer.

20. A system as in Claim 18 wherein the multi-dimensional displays are three-dimensioned.

21. A system as in Claim 18 wherein said software automatically divides the multi-dimensional displays into user-defined segments.

22. A method as in Claim 18 wherein said software is programmed to calculate individual pixel intensity change over a predetermined time interval.

23. A method as in Claim 18 wherein said software is programmed to calculate overall intensity change over said time periods for each respective said segment.

24. A method as in Claim 18 wherein said software is programmed to simultaneously display a plurality of selected said multi-dimensional views obtained at distinct predetermined time intervals.

25. A method as in Claim 18 wherein said software is programmed to automatically determine size and location of a perfusion defect area, and to automatically compare data from respective corresponding perfusion defect areas.